

Coordinated Incoherent Scatter Radar and Fabry-Perot Interferometer observations of
ionosphere-thermosphere
disturbances during the March 17-18, 2015 great solar storm

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With a tremendous drop of the Dst index to ~ -230 nT, the geomagnetic storm during March 17-18, 2015 has been the largest during the current solar cycle. This storm was caused by a combined effect of the arriving solar Coronal Mass Ejection materials with high-speed solar wind streams originated from a nearby coronal hole. It was very fortunate for us to have coordinated an international campaign monitoring geospace disturbances during this period using ground-based facilities. These include incoherent scatter radars and Fabry-Perot Interferometers in the America sectors and other instruments in East Asia sectors, forming an observational network along approximately the 60W/120E meridional circle. The presentation will highlight these ground-based observations along with simultaneous DMSP in situ measurements and TEC from a network of dense GPS receivers, with a focus on (1) the ion-neutral coupling processes at subauroral and mid-latitudes; (2) periodic midlatitude ionospheric disturbances; and (3) topside ionospheric variations. In particular, one of the most striking features to be discussed is the unexpected pre-midnight northward neutral wind surge, observed over multiple subauroral and midlatitude sites, accompanying strong westward winds developed at earlier times. We ascribe these wind disturbances to Subauroral Polarization Stream (SAPS).

Keywords: geomagnetic storm, magnetosphere-ionosphere-thermosphere coupling, incoherent scatter radar, Fabry-Perot Interferometer